PATENT SPECIFICATION

802,404

Date of Application and filing Complete Specification April 23, 1956.

No. 12321/56.

Application made in Germany on April 22, 1955.

Complete Specification Published Oct. 1, 1958.

Index at acceptance: —Classes 108(2), D(2A1A2: 2A2D: 6E); and 108(3), S5H6.

International Classification: —B62d. F06f.

COMPLETE SPECIFICATION

Improved Spring Suspension for Motor Vehicles with Rigid Axles

We, MASCHINENFABRIK AUGSBURG-NURNBERG, A.G., of Nürnberg, Germany, a German Company, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The invention relates to a spring suspension for motor vehicles with rigid axles. It is intended to solve the problem of employing an axle guide with torsion bar stabiliser, which supports the axle guide elastically with a progressively increasing rate and produces a parallel motion of the axle body as it moves elastically. Also the brake linkage is to be designed so that no kinematic errors occur as the axle moves elastically.

In known types of axle guides with torsion bar stabiliser, the ends of the guides are connected rigidly both to the torsion bar stabiliser and also to the axle. Thus, a type of guide which does not oppose much resistance to torsional deformation will certainly avoid excessive stresses in the guide, if the axle is elastically supported only on one side, but the axle body is not guided parallel to itself, when it moves elastically, but performs a rotary motion about its longitudinal axis. This design is not suitable for motor vehicles with rigid axles, which are driven by a Cardan drive shaft, because the different angles of inclination of a Cardan drive shaft may cause noise. Also, the springs supporting the axle must deflect according to a linear law, if they are designed as leaf springs, since they are connected at least at one end by means of an eye to the vehicle frame.

According to the invention, these disadvantages can be avoided by means of two leaf springs of which the centers are fixed to the axle and of which the ends can roll freely with reference to spring blocks on which the springs are guided laterally by means of plates, while the driving and braking forces are transmitted from the wheel to the frame by means of torsionally non-rigid guides, which are articulated at one end to the axle, while their other ends are firmly fixed to a torsion bar stabiliser connecting the two guides.

According to a further feature of the invention, the torsionally non-rigid guide may be made of two spring leaves adapted to bend transversely of the vehicle and arranged at some distance from each other, which may be provided with an intermediate piece fixed between the two spring leaves halfway along their length, in order to reduce the free buckling length. By means of this particular torsionally non-rigid design of the guides, which is already known, excessive forces on the guides are avoided, in case one end of the axle is turning downwardly while the other end thereof is turning upwardly.

In this case, the spring leaves may be fixed at both ends by means of eye pieces, where the end adjacent the axle body is equipped with a rubber component, which is already known, and the end adjacent the torsion bar is provided with serrations.

It is convenient to effect the fixing of the guide to the axle body by means of a bearing fixed between the axle body and the leaf spring.

According to the invention, the guide fixed to the torsion bar ends equipped with serrations can be supported between the two known kinds of rubber components of which the inner peripheries are serrated. This arrangement achieves that if the torsion bar fractures, the axle is still guided satisfactorily, which offers a substantial advantage compared with designs which have become known hitherto.

According to the invention, a kinematically perfect brake linkage is achieved by disposing the intermediate shaft of a brake of the vehicle concentrically with reference to the torsion bar, where the intermediate brake shaft is supported in bearings with rubber components pressed into them, and which can be removed sideways from the frame. This ensures that the sensitive torsion bar is protected against rubble, and furthermore, the

brake linkage connected to the brake cam shaft fixed on the axle does not show any kinematic defects when it moves elastically, although such defects can be found in almost all types of axle guiding devices.

Due to the fact that the spring blocks are equipped underneath with rolling cams, which enable each spring leaf to roll along its two ends, an elastic support with a progressively increasing rate is obtained.

The accompanying drawing shows diagrammatically an example of an embodiment of the invention, where:—

Figure 1 is a side view, and

Figure 2 is a plan view of the axle guide.

The axle guide is fixed to the leaf springs 3 through the intermediate of two bearings 2. These leaf springs are supported at their ends on spring blocks 4. The plates 5 fixed to the spring blocks guide the leaf spring laterally. The spring blocks are equipped underneath with rolling cams 6, on which the spring ends roll freely.

The two guides 7 are employed to transmit the driving and braking forces from the wheels to the vehicle frame. Each guide consists of two spring leaves 8 in a vertical position, and arranged at some distance from each other, which are equipped with an intermediate piece 9 in order to reduce the free buckling length. The eye pieces 10 and 11 are arranged at the two ends of the guides 7. The eye piece 10 is hinged on the bearing 2 by means of the rubber component 10a. The eye piece 11 is provided with serrations, and fixed by means of them to the torsion bar 12. The bearings 13 are welded to the spring blocks 4. The torsion bar is supported by means of rubber components 14 in these bearings. The eye pieces 11 are arranged between the rubber elements 14 on the torsion bar 12. The brake shaft 15 is also supported in the bearings 13, so that the torsion bar 12 is protected against damage by rubble. This arrangement ensures also that kinematic errors do not occur in the brake linkage as the wheels move elastically.

WHAT WE CLAIM IS:—

1. A spring suspension for motor vehicles with rigid axles, in which the elastic support of the vehicle frame is effected by means of two leaf springs fixed to the rigid axle, where the leaf springs can roll freely with their two ends, each on one spring block on which they are guided laterally by means of plates, while the driving and braking forces are transmitted from the wheel to the frame by means of guides which are torsionally not rigid, and each of which is hinged at one of its ends to the rigid axle while its other end is fixed to a torsion bar stabiliser connecting the two guides.

2. A spring suspension according to Claim 1, in which the torsionally non-rigid guide consists of two spring leaves adapted to bend transversely of the vehicle and arranged at some distance from each other, which are equipped with an intermediate piece half-way along their length and between them, in order to reduce the free buckling length.

3. A spring suspension according to Claim 2, in which the spring leaves of the guide are fixed at both ends to eye pieces where the end adjacent the axle body supports a known type of rubber component while the end adjacent the torsion bar is serrated.

4. A spring suspension according to Claim 2, in which the guides are fixed to the rigid axle by means of a bearing fixed between the axle and guide.

5. A spring suspension according to Claim 3, in which the guide is fixed on the torsion bar ends which are serrated, and is arranged between known types of rubber components of which the inner peripheries are serrated.

6. A spring suspension according to Claim 1, in which the intermediate shaft of a brake of the vehicle is disposed concentrically with reference to the torsion bar which is supported in bearings which can be removed sideways from the frame with the spring blocks.

7. A spring suspension according to Claim 1, in which the spring blocks are provided underneath with rolling cams, which enables each end of each leaf spring to roll on a respective one of the cams.

8. A spring suspension substantially as described and as illustrated in the accompanying drawing.

MARKS & CLERK.

Leamington Spa: Printed for Her Majesty's Stationery Office, by the Courier Press,—1958.
Published at the Patent Office, 25, Southampton Buildings, London, W.C.2, from which copies may be obtained.

802,404 COMPLETE SPECIFICATION
1 SHEET

This drawing is a reproduction of the Original on a reduced scale.

Fig.1

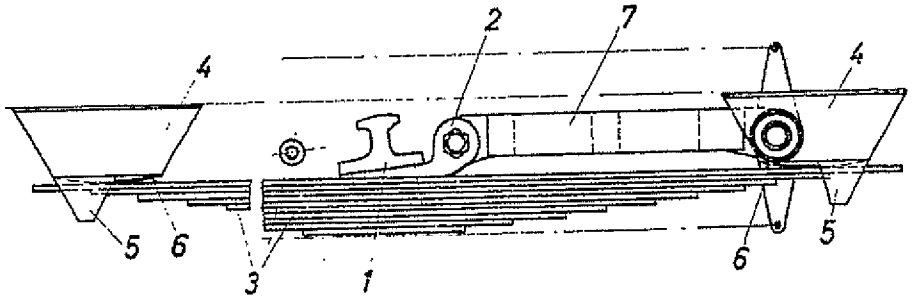

Fig.2